

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MUTOH IND LTD

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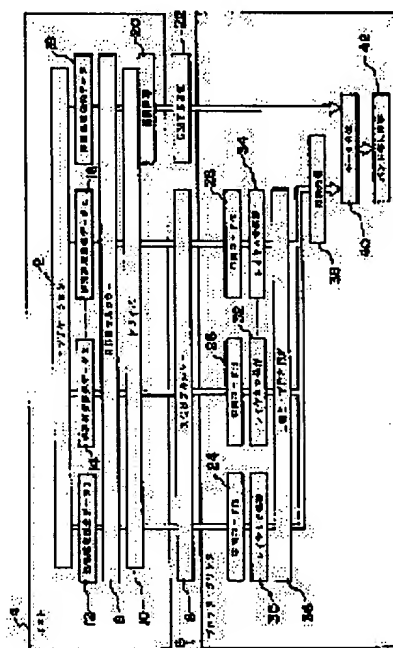
(72)Inventor : SHIRASAKI AKIMITSU

(54) COLOR IMAGE PRINT SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To shorten the time needed for a printing process by determining which of a host computer side or a printer plotter side performs a raster image generating process for printer output.

SOLUTION: The host computer 4 and plotter printer 6 are respectively equipped with raster image processors 20 and 38 which convert source color image data to raster image data for printer output. The host computer 4 sorts the inputted source color image data into plotting-quality preference data and processing-speed preference data; and the plotting-quality preference data are binarized by the raster image processor 20 on the host computer side and the processing-speed preference data are binarized by the raster image processor 38 on the plotter printer side. The raster data generated on the sides of the host computer 4 and plotter printer 6 are put together on the side of the plotter printer 6 and the composite data are printed.



LEGAL STATUS

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[Date of requesting appeal against examiner's decision of rejection]

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CLAIMS

[Claim(s)]

[Claim 1] The host computer which generates the original color picture data which should be carried out a printout, An image-processing means to change into the raster image data for a printer output the original color picture data generated with this host computer, In the color picture printing system equipped with the plotter printer which carries out the printout of the raster image data for a printer output processed with this image-processing means said image-processing means from the 1st image-processing means formed in said host computer side, and the 2nd image-processing means formed in said plotter printer side — changing — said Hara color picture data — illustrating — with a quality expedited data a processing speed expedited data — a partition opium poppy and illustrating — the color picture printing system characterized by processing a quality expedited data with said 1st image-processing means, and processing a processing speed expedited data with said 2nd image-processing means.

[Claim 2] A color picture printing system given in "claim 1" characterized by coalescing the raster data generated with said 1st and 2nd image-processing means by said plotter printer side, and making it print this data that coalesced.

[Claim 3] A color picture printing system given in "claim 2" characterized by whether to overwrite or draft the image data by the side of said plotter printer to the raster image data for a printer output of the 1st image-processing means by the side of a host computer, and judging, being based on this judgment result, and overwriting or drafting the raster image data for a printer output of said 2nd image-processing means to the raster image data for a printer output of said 1st image-processing means.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the color picture printing system which changes into the color picture data which can print the original color picture data read with the CAD data generated by the CAD system, or an image scanner, and is outputted from a plotter printer.

[0002]

[Description of the Prior Art] By the color raster plotter printer, when printing RGB full color data, 256 color data, etc., it is necessary to make it the color and general target which can print Printer/Plotter at the binary expression of CMYK. There are an approach of performing this raster image generation processing by the host computer side, and sending the result made binary to a plotter printer, and a method of processing original color picture data, such as RGB full color data and 256 color data, within delivery and a plotter printer to a plotter printer, and the advantage and demerit are accepted in each.

[0003]

[Problem(s) to be Solved by the Invention] It has [since fine binary-ized processing is possible for the system which binary-ized processing in which original color picture data are changed into the raster image for a printer output is performed, and sends this processing result to a plotter printer by the host computer side,] the demerit in which transfer data serve as a large quantity while it has the advantage in which a quality of printed character becomes good, and release of a host computer becomes slow. While the system which performs binary-ized processing in which original color picture data are changed into the raster image for a printer output, by the plotter printer side has the advantage in which the load of a host computer is mitigated, it has the demerit in which quality printing is not obtained. rather than it accomplishes this invention in view of the advantage and demerit of a system conventionally [above-mentioned] and performs all the raster image generation processings for a printer output by the host computer side — a high speed — moreover, it aims at offering the color picture printing system it enabled it to print in high quality rather than performing all the raster image generation processings for a printer output by the plotter printer side.

[0004]

[Means for Solving the Problem] The host computer which generates the original color picture data which should carry out the printout of this invention in order to attain the above-mentioned trouble, An image-processing means to change into the raster image data for a printer output the original color picture data generated with this host computer, In the color picture printing system equipped with the plotter printer which carries out the printout of the raster image data for a printer output processed with this image-processing means said image-processing means from the 1st image-processing means formed in said host computer side, and the 2nd image-processing means formed in said plotter printer side — changing — said Hara color picture data — illustrating — with a quality expedited data A quality expedited data is processed with said 1st image-processing means. a processing speed expedited data — a partition opium poppy and illustrating — It is characterized by processing a processing speed expedited data with said 2nd image-processing means. The raster data generated with said 1st and 2nd image-processing means are coalesced by said plotter printer side. It is characterized by making it print this data that

coalesced, judge whether the image data by the side of said plotter printer is overwritten or drafted to the raster image data for a printer output of the 1st image-processing means by the side of a host computer, and it is based on this judgment result. The raster image data for a printer output of said 2nd image-processing means are overwritten or drafted to the raster image data for a printer output of said 1st image-processing means.

[0005]

[Embodiment of the Invention] With reference to a drawing, the gestalt of operation of this invention is explained below. Drawing is a functional block diagram showing the color image printing structure of a system concerning the gestalt of operation of this invention. This system consists of plotter printers (6) which receive image data, such as an image data, alphabetic data, and line drawing data, and carry out printing processing through a SCSI interface etc. from the host computer (4) with which image-processing application (2) was stored, and this host computer (4).

[0006] It has the scanner (graphic display abbreviation) for carrying out input process of the image as a predetermined image data, and capturing it to a host computer (4) to a host computer (4), the keyboard (graphic display abbreviation) which inputs character codes, such as an alphabetic character and a notation, into a host computer (4), and the mouse (graphic display abbreviation) which inputs coordinate data and a predetermined command into a host computer (4) at the time of creation and edit of the line drawing data in a host computer (4) etc. Original color picture data are once stored in activity memory, such as a hard disk, at a host computer (4) side.

[0007] That is, although original color picture data consist of line drawing data generated using the compressed color image data which was read from the scanner, the character code inputted from a keyboard, the mouse, etc., these data will be rasterized by the graphic drawing function of application (2), and this rasterizing data (8), i.e., RGB full color data, will be stored in activity memory. the original color picture data stored in activity memory — a driver (10) — automatic — or a CAD operator's keyboard grabbing — a processing speed expedited data (12), (14), (16), and illustrating — it is classified into a quality expedited data (18), and the printer driver (10) is supplied.

[0008] the case where the photograph data of 10cm angle extent are stuck on the map data read with the scanner — map data — illustrating — it is classified as a quality expedited data (16), and photograph data are classified into a processing speed expedited data (10), (12), and (14). The printer driver (10) was equipped with the raster image processor (RIP) (18) which carries out transform processing of the rasterizing data to the color picture data for a printer output suitable for Printer/Plotter, for example, is equipped with the edge enhancement section, amplification/cutback section, the color correction section, the binary-ized section, a RGB-CMYK converter, etc.

[0009] The edge enhancement section has a function for expressing clearly the profile of the image by which a printout is carried out. Since the image by which a printout is carried out is expressed by the pixel, it tends to become indefinite [a profile]. So, in the edge enhancement section, the edge part of an image is emphasized, for example by Gaussian filter processing etc. Amplification/cutback section expands the size of the image by which a printout is carried out, or has the function to change the original color picture data for reducing and expressing.

[0010] Since the image data by which a printout is carried out is expressed by the pixel, an image will become coarse if especially original color picture data are expanded as it is. So, in amplification/cutback section, it interpolates with reference to the image data of the boundary region of each pixel. The color correction section amends a gap of some hue produced by the difference between the color of the numeric value expressed inside the host computer and the color actually outputted by the printer, i.e., the property difference between both equipments, and replaces the color of a pixel with reference to the color matching table prepared beforehand by each pixel of rasterizing data.

[0011] the binary-ized section — RGB — it is full color and the expressed image data is changed into a false full color image, and image data is reconstructed so that it may look in full color combining White, cyanogen, a magenta, yellow, black, red, Green, and eight kinds of blue colors. In this binary-ized section, a well-known pattern dither method, an error diffusion method, etc. are used. The color of each pixel called for in the binary-ized section is a RGB-CMYK converter, by the printer, is changed into the cyanogen in which an output is possible, a magenta, yellow, and

four ink colors of black, and is outputted as CMYK binary data (22).

[0012] A plotter printer (6) pseudo-code-izes the RGB full color data (8) sent from a host computer (4) by the pseudo code-ized processing section (24), (26), and (28), and saves them by each layer (30), (32), and (34). The driver by the side of a plotter printer (6) is equipped with overwrite / draft judging section (36).

[0013] A binary expression is carried out at the color which can print Printer/Plotter (6) by the raster image processor (38) by the side of a plotter printer (6), and the RGB full color data with which it was pseudo-code-ized the object for overwrite chosen in overwrite / draft judging section (36) or for the draft are sent to the data coalesce section (40). The data coalesce section (40) coalesces the data binary-ization-processed by the plotter printer (6) side, and the data binary-ization-processed by the host computer (4) side. The output-processing section (42) prints the data which these-coalesced for every band.

[0014] Next, actuation of the gestalt of this operation is explained. First, a host computer (2) sends a processing speed expedited data (12), (14), and (16) to a plotter printer (6) side as RGB full color data (8). A plotter printer (6) is accumulated in a layer (30), (32), and (34) in the form of a pseudo code, without printing the sent data. As for the data processed by the plotter printer (6) side, not only an image data but vector data are contained. Weighting of the data processed by the plotter printer (6) side is carried out, and they can also carry out layer processing.

[0015] At this time, there may be a layer printed under the binary-ized data which are finally sent to a plotter printer (6) side, and which were processed by the host computer (4) side. Finally, the data (22) binary-ization-processed by the host computer (4) side are sent to the data coalesce section (40) of a plotter printer (6). Since this data (22) is already made binary, a plotter printer (6) is printing in the order which received, and can mitigate the memory by the side of a plotter printer (6).

[0016] The data processed by the host computer (4) side and the data processed by the raster image processor (38) by the side of a plotter printer (6) coalesce, and are printed for every band. At this time, both overwrite and the draft of the data processed by the host computer (4) side are possible for the data processed by the plotter printer (6) side. When sticking the photograph data of 10cm angle extent on the map data read with the scanner, in order that a map may generate the raster image for the printer output of high quality, raster image generation binary-ized processing for a printer output is performed by the host computer (4) side.

[0017] Since an outline should just understand a photograph, it is binary-ization-processed in the raster image generation processing section for a printer output (38) by the side of a plotter printer (6). The data binary-ization-processed by the plotter printer (6) side must be sent before the data binary-ization-processed by the host computer (4) side. When buffer overflow is carried out, it becomes impossible otherwise, to draw a picture. The data binary-ization-processed by the host computer (4) side can illustrate after buffer overflow.

[0018] Furthermore, since the data sent later cannot be overwritten and lead data cannot be illustrated, when there is no overwrite / draft judging section (36), binary-ized data processing by the side of a host computer must extract the part of a photograph. This activity is very complicated. By adding the function to overwrite the binary-ized data by the side of the host computer (4) with which lead data is sent later, relief of the binary-ized processing activity by the side of a host computer (4) can be aimed at.

[0019] Moreover, the binary-ized data by the side of a host computer (4) need to turn up to use the polygon function of a vector for some binary-ized data by the side of a host computer (4), and color. In this case, what is necessary is just to draft to the binary-ized data by the side of the host computer (4) with which the polygon data to precede are sent later.

[0020] In addition, the image processing which changes original color picture data into the raster image data for a printer output by the host computer (4) side A part of the processing may be made to perform to the raster image processor (38) by the side of a plotter printer (6). Moreover, the image processing which changes original color picture data into the raster image data for a printer output by the plotter printer (6) side may make a part of the processing perform to the raster image processor (20) by the side of a host computer (4) similarly.

[0021]

[Effect of the Invention] illustrating of the map data read with the scanner since this invention was

constituted like **** — a quality expedited data can be printed with high definition, and processing speed expedited datas, such as rough photograph drawing and illustration drawing, can be printed at high speed.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the color picture printing system which changes into the color picture data which can print the original color picture data read with the CAD data generated by the CAD system, or an image scanner, and is outputted from a plotter printer.

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PRIOR ART

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] It has [since fine binary-ized processing is possible for the system which binary-ized processing in which original color picture data are changed into the raster image for a printer output is performed, and sends this processing result to a plotter printer by the host computer side,] the demerit in which transfer data serve as a large quantity while it has the advantage in which a quality of printed character becomes good, and release of a host computer becomes slow. While the system which performs binary-ized processing in which original color picture data are changed into the raster image for a printer output, by the plotter printer side has the advantage in which the load of a host computer is mitigated, it has the demerit in which quality printing is not obtained. rather than it accomplishes this invention in view of the advantage and demerit of a system conventionally [above-mentioned] and performs all the raster image generation processings for a printer output by the host computer side — a high speed — moreover, it aims at offering the color picture printing system it enabled it to print in high quality rather than performing all the raster image generation processings for a printer output by the plotter printer side.

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MEANS

[Means for Solving the Problem] The host computer which generates the original color picture data which should carry out the printout of this invention in order to attain the above-mentioned trouble, An image-processing means to change into the raster image data for a printer output the original color picture data generated with this host computer, In the color picture printing system equipped with the plotter printer which carries out the printout of the raster image data for a printer output processed with this image-processing means said image-processing means from the 1st image-processing means formed in said host computer side, and the 2nd image-processing means formed in said plotter printer side — changing — said Hara color picture data — illustrating — with a quality expedited data A quality expedited data is processed with said 1st image-processing means. a processing speed expedited data — a partition opium poppy and illustrating — — It is characterized by processing a processing speed expedited data with said 2nd image-processing means. The raster data generated with said 1st and 2nd image-processing means are coalesced by said plotter printer side. It is characterized by making it print this data that coalesced, judge whether the image data by the side of said plotter printer is overwritten or drafted to the raster image data for a printer output of the 1st image-processing means by the side of a host computer, and it is based on this judgment result. The raster image data for a printer output of said 2nd image-processing means are overwritten or drafted to the raster image data for a printer output of said 1st image-processing means.

[0005]

[Embodiment of the Invention] With reference to a drawing, the gestalt of operation of this invention is explained below. Drawing is a functional block diagram showing the color image printing structure of a system concerning the gestalt of operation of this invention. This system consists of plotter printers (6) which receive image data, such as an image data, alphabetic data, and line drawing data, and carry out printing processing through a SCSI interface etc. from the host computer (4) with which image-processing application (2) was stored, and this host computer (4).

[0006] It has the scanner (graphic display abbreviation) for carrying out input process of the image as a predetermined image data, and capturing it to a host computer (4) to a host computer (4), the keyboard (graphic display abbreviation) which inputs character codes, such as an alphabetic character and a notation, into a host computer (4), and the mouse (graphic display abbreviation) which inputs coordinate data and a predetermined command into a host computer (4) at the time of creation and edit of the line drawing data in a host computer (4) etc. Original color picture data are once stored in activity memory, such as a hard disk, at a host computer (4) side.

[0007] That is, although original color picture data consist of line drawing data generated using the compressed color image data which was read from the scanner, the character code inputted from a keyboard, the mouse, etc., these data will be rasterized by the graphic drawing function of application (2), and this rasterizing data (8), i.e., RGB full color data, will be stored in activity memory. the original color picture data stored in activity memory — a driver (10) — automatic — or a CAD operator's keyboard grabbing — a processing speed expedited data (12), (14), (16), and illustrating — it is classified into a quality expedited data (18), and the printer driver (10) is supplied.

[0008] the case where the photograph data of 10cm angle extent are stuck on the map data read with the scanner — map data — illustrating — it is classified as a quality expedited data (16), and

photograph data are classified into a processing speed expedited data (10), (12), and (14). The printer driver (10) was equipped with the raster image processor (RIP) (18) which carries out transform processing of the rasterizing data to the color picture data for a printer output suitable for Printer/Plotter, for example, is equipped with the edge enhancement section, amplification/cutback section, the color correction section, the binary-ized section, a RGB-CMYK converter, etc.

[0009] The edge enhancement section has a function for expressing clearly the profile of the image by which a printout is carried out. Since the image by which a printout is carried out is expressed by the pixel, it tends to become indefinite [a profile]. So, in the edge enhancement section, the edge part of an image is emphasized, for example by Gaussian filter processing etc. Amplification/cutback section expands the size of the image by which a printout is carried out, or has the function to change the original color picture data for reducing and expressing.

[0010] Since the image data by which a printout is carried out is expressed by the pixel, an image will become coarse if especially original color picture data are expanded as it is. So, in amplification/cutback section, it interpolates with reference to the image data of the boundary region of each pixel. The color correction section amends a gap of some hue produced by the difference between the color of the numeric value expressed inside the host computer and the color actually outputted by the printer, i.e., the property difference between both equipments, and replaces the color of a pixel with reference to the color matching table prepared beforehand by each pixel of rasterizing data.

[0011] the binary-ized section — RGB — it is full color and the expressed image data is changed into a false full color image, and image data is reconstructed so that it may look in full color combining White, cyanogen, a magenta, yellow, black, red, Green, and eight kinds of blue colors. In this binary-ized section, a well-known pattern dither method, an error diffusion method, etc. are used. The color of each pixel called for in the binary-ized section is a RGB-CMYK converter, by the printer, is changed into the cyanogen in which an output is possible, a magenta, yellow, and four ink colors of black, and is outputted as CMYK binary data (22).

[0012] A plotter printer (6) pseudo-code-izes the RGB full color data (8) sent from a host computer (4) by the pseudo code-ized processing section (24), (26), and (28), and saves them by each layer (30), (32), and (34). The driver by the side of a plotter printer (6) is equipped with overwrite / draft judging section (36).

[0013] A binary expression is carried out at the color which can print Printer/Plotter (6) by the raster image processor (38) by the side of a plotter printer (6), and the RGB full color data with which it was pseudo-code-ized the object for overwrite chosen in overwrite / draft judging section (36) or for the draft are sent to the data coalesce section (40). The data coalesce section (40) coalesces the data binary-ization-processed by the plotter printer (6) side, and the data binary-ization-processed by the host computer (4) side. The output-processing section (42) prints the data which these-coalesced for every band.

[0014] Next, actuation of the gestalt of this operation is explained. First, a host computer (2) sends a processing speed expedited data (12), (14), and (16) to a plotter printer (6) side as RGB full color data (8). A plotter printer (6) is accumulated in a layer (30), (32), and (34) in the form of a pseudo code, without printing the sent data. As for the data processed by the plotter printer (6) side, not only an image data but vector data are contained. Weighting of the data processed by the plotter printer (6) side is carried out, and they can also carry out layer processing.

[0015] At this time, there may be a layer printed under the binary-ized data which are finally sent to a plotter printer (6) side, and which were processed by the host computer (4) side. Finally, the data (22) binary-ization-processed by the host computer (4) side are sent to the data coalesce section (40) of a plotter printer (6). Since this data (22) is already made binary, a plotter printer (6) is printing in the order which received, and can mitigate the memory by the side of a plotter printer (6).

[0016] The data processed by the host computer (4) side and the data processed by the raster image processor (38) by the side of a plotter printer (6) coalesce, and are printed for every band. At this time, both overwrite and the draft of the data processed by the host computer (4) side are possible for the data processed by the plotter printer (6) side. When sticking the photograph data of 10cm angle extent on the map data read with the scanner, in order that a map may generate

the raster image for the printer output of high quality, raster image generation binary-ized processing for a printer output is performed by the host computer (4) side.

[0017] Since an outline should just understand a photograph, it is binary—ization—processed in the raster image generation processing section for a printer output (38) by the side of a plotter printer (6). The data binary—ization—processed by the plotter printer (6) side must be sent before the data binary—ization—processed by the host computer (4) side. When buffer overflow is carried out, it becomes impossible otherwise, to draw a picture. The data binary—ization—processed by the host computer (4) side can illustrate after buffer overflow.

[0018] Furthermore, since the data sent later cannot be overwritten and lead data cannot be illustrated, when there is no overwrite / draft judging section (36), binary-ized data processing by the side of a host computer must extract the part of a photograph. This activity is very complicated. By adding the function to overwrite the binary-ized data by the side of the host computer (4) with which lead data is sent later, relief of the binary-ized processing activity by the side of a host computer (4) can be aimed at.

[0019] Moreover, the binary-ized data by the side of a host computer (4) need to turn up to use the polygon function of a vector for some binary-ized data by the side of a host computer (4), and color. In this case, what is necessary is just to draft to the binary-ized data by the side of the host computer (4) with which the polygon data to precede are sent later.

[0020] In addition, the image processing which changes original color picture data into the raster image data for a printer output by the host computer (4) side A part of the processing may be made to perform to the raster image processor (38) by the side of a plotter printer (6). Moreover, the image processing which changes original color picture data into the raster image data for a printer output by the plotter printer (6) side may make a part of the processing perform to the raster image processor (20) by the side of a host computer (4) similarly.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the color picture printing structure of a system which is 1 operation gestalt of this invention.

[Description of Notations]

2 Application

4 Host Computer

6 Plotter Printer

8 RGB Full Color Data

10 Driver

12 Processing Speed Expedited Data

14 Processing Speed Expedited Data

16 Processing Speed Expedited Data

18 Illustrating — Quality Expedited Data

20 Raster Image Processor

22 CMYK Binary Data

24 Pseudo Code-ized Processing Section

26 Week Coding Processing Section

28 Pseudo Code-ized Processing Section

30 Layer

32 Layer

34 Layer

36 Overwrite / Draft Judging Section

38 Raster Image Processor

40 Data Coalesce Section

42 Output-Processing Section

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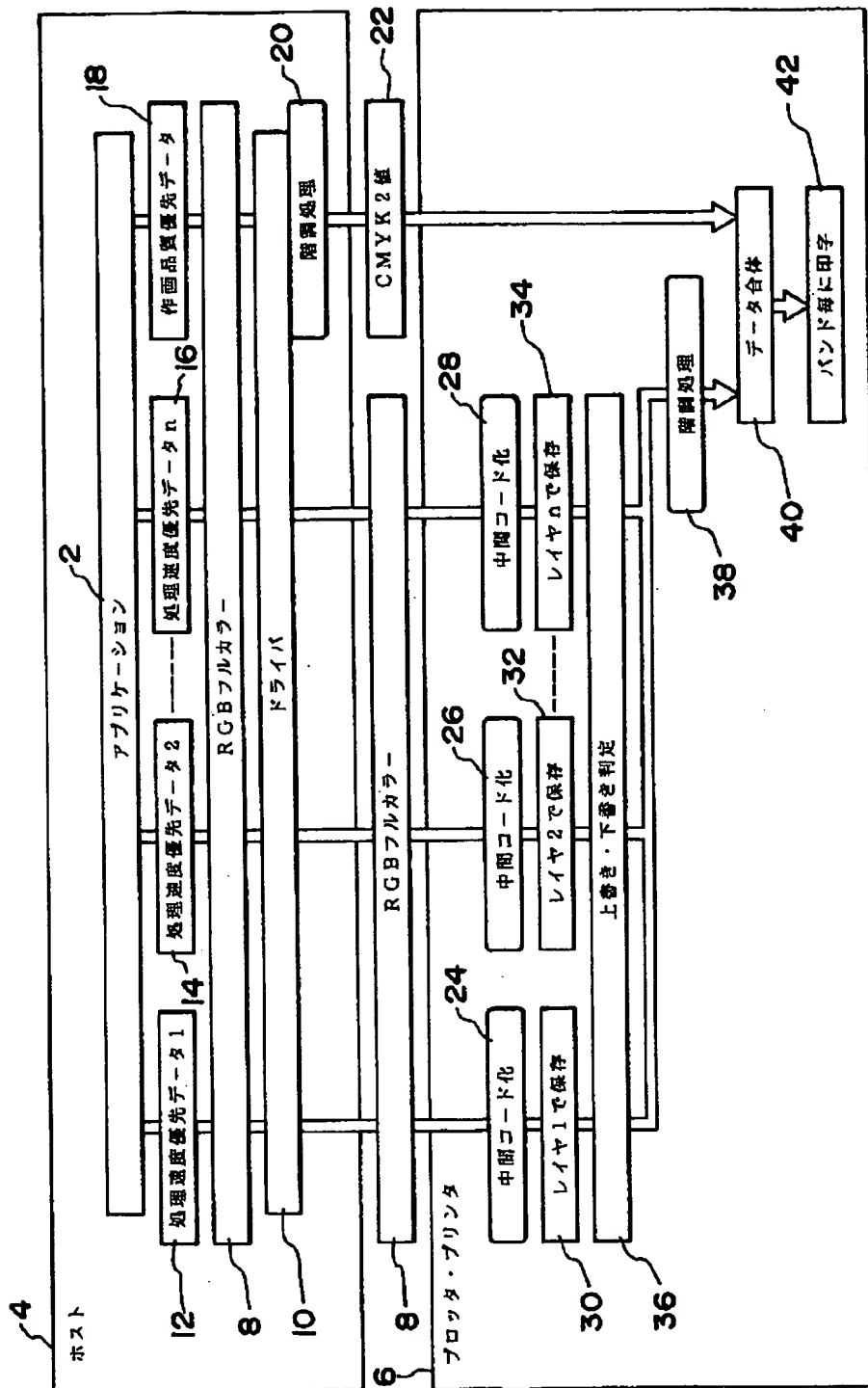
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DRAWINGS

[Drawing 1]



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(19) 日本国特許庁 (J P)

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(11) 特許出願公開番号

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(P2000-39979A)

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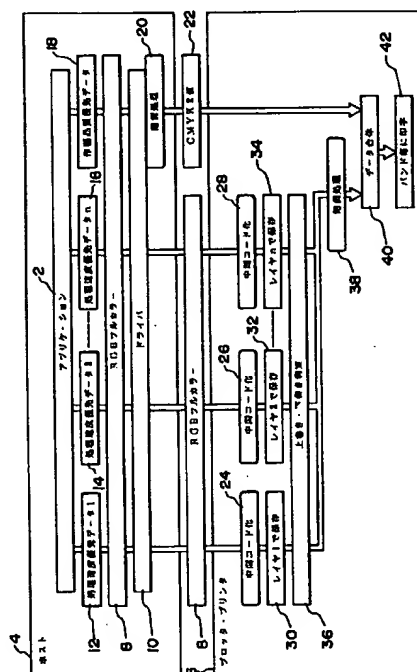
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(54) 【発明の名称】 カラー画像印刷システム

(57) 【要約】 (修正有)

【課題】 プリンタ出力用ラスタイメージ生成処理を、ホストコンピュータ側で行うか、プリンタ・プロッタ側で行うか決定し、印刷処理に要する時間を短縮する。

【解決手段】 ホストコンピュータ4と、プロッタ・プリンタ6は、原カラー画像データをプリンタ出力用ラスタイメージデータに変換するラスタイメージプロセッサ20、38をそれぞれ備えている。ホストコンピュータ4は、取り込んだ原カラー画像データを、作画品質優先データと、処理速度優先データに区分けし、作画品質優先データの2値化処理をホストコンピュータ4側のラスタイメージプロセッサ20で行い、処理速度優先データの2値化処理を、プロッタ・プリンタ6側のラスタイメージプロセッサ38で行う。ホストコンピュータ4と、プロッタ・プリンタ6側で生成したラスタイメージデータはプロッタ・プリンタ6側で合体され、この合体されたデータが印字される。



【特許請求の範囲】

【請求項 1】 印刷出力すべき原カラー画像データを生成するホストコンピュータと、このホストコンピュータで生成された原カラー画像データをプリンタ出力用ラスタイメージデータに変換する画像処理手段と、この画像処理手段で処理されたプリンタ出力用ラスタイメージデータを印刷出力するプロッタ・プリンタとを備えたカラー画像印刷システムにおいて、前記画像処理手段は、前記ホストコンピュータ側に設けられた第 1 の画像処理手段と、前記プロッタ・プリンタ側に設けられた第 2 の画像処理手段とから成り、前記原カラー画像データを、作画品質優先データと、処理速度優先データに区分けし、作画品質優先データの処理を前記第 1 の画像処理手段で行い、処理速度優先データの処理を前記第 2 の画像処理手段で行うことを特徴とするカラー画像印刷システム。

【請求項 2】 前記第 1 と第 2 の画像処理手段で生成したラスタデータを前記プロッタ・プリンタ側で合体し、この合体したデータを印字するようにしたことを特徴とする「請求項 1」に記載のカラー画像印刷システム。

【請求項 3】 前記プロッタ・プリンタ側の画像データをホストコンピュータ側の第 1 の画像処理手段のプリンタ出力用ラスタイメージデータに上書きあるいは下書きするか判定し、該判定結果に基づいて、前記第 2 の画像処理手段のプリンタ出力用ラスタイメージデータを前記第 1 の画像処理手段のプリンタ出力用ラスタイメージデータに上書きあるいは下書きするようにしたことを特徴とする「請求項 2」に記載のカラー画像印刷システム。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】 本発明は CAD システムで生成される CAD データやイメージスキャナで読みとられた原カラー画像データを印刷可能なカラー画像データに変換してプロッタ・プリンタから出力するカラー画像印刷システムに関する。

【0002】

【従来の技術】 カラーラスタプロッタ・プリンタで、RGB フルカラーデータや 256 カラーデータなどを印字する場合、プリンタ・プロッタが印字できる色、一般的には、CMYK の 2 値表現にする必要がある。このラスタイメージ生成処理は、ホストコンピュータ側で行い、2 値化された結果をプロッタ・プリンタに送る方法と、RGB フルカラーデータや 256 カラーデータなどの原カラー画像データをプロッタ・プリンタに送り、プロッタ・プリンタ内で処理する方法があり、それぞれに長所と短所が認められる。

【0003】

【発明が解決しようとする課題】 ホストコンピュータ側で、原カラー画像データをプリンタ出力用のラスタイメージに変換する 2 値化処理が行われ、この処理結果をプロッタ・プリンタに送るシステムは、きめ細かい 2 値化

処理が可能のため、印字品質が良好となるという長所がある反面、ホストコンピュータの解放が遅くなるとともに転送データが大量となるという短所がある。プロッタ・プリンタ側で、原カラー画像データをプリンタ出力用のラスタイメージに変換する 2 値化処理を行うシステムは、ホストコンピュータの負荷が軽減されるという長所がある反面、高品質な印字が得られないという短所がある。本発明は上記従来システムの長所と短所に鑑みて成されたものであり、プリンタ出力用ラスタイメージ生成処理の全てをホストコンピュータ側で行うより高速に、また、プリンタ出力用ラスタイメージ生成処理の全てをプロッタ・プリンタ側で行うより高品質に印字できるようにしたカラー画像印刷システムを提供することを目的とするものである。

【0004】

【課題を解決するための手段】 上記問題点を達成するため、本発明は、印刷出力すべき原カラー画像データを生成するホストコンピュータと、このホストコンピュータで生成された原カラー画像データをプリンタ出力用ラスタイメージデータに変換する画像処理手段と、この画像処理手段で処理されたプリンタ出力用ラスタイメージデータを印刷出力するプロッタ・プリンタとを備えたカラー画像印刷システムにおいて、前記画像処理手段は、前記ホストコンピュータ側に設けられた第 1 の画像処理手段と、前記プロッタ・プリンタ側に設けられた第 2 の画像処理手段とから成り、前記原カラー画像データを、作画品質優先データと、処理速度優先データに区分けし、作画品質優先データの処理を前記第 1 の画像処理手段で行い、処理速度優先データの処理を前記第 2 の画像処理手段で行うことを特徴とし、前記第 1 と第 2 の画像処理手段で生成したラスタデータを前記プロッタ・プリンタ側で合体し、この合体したデータを印字するようにしたことを特徴とし、前記プロッタ・プリンタ側の画像データをホストコンピュータ側の第 1 の画像処理手段のプリンタ出力用ラスタイメージデータに上書きあるいは下書きするか判定し、該判定結果に基づいて、前記第 2 の画像処理手段のプリンタ出力用ラスタイメージデータを前記第 1 の画像処理手段のプリンタ出力用ラスタイメージデータに上書きあるいは下書きするようにしたものである。

【0005】

【発明の実施の形態】 以下に図面を参照して本発明の実施の形態について説明する。図は本発明の実施の形態に係わるカラーイメージ印刷システムの構成を示す機能ブロック図である。このシステムは、画像処理アプリケーション (2) が格納されたホストコンピュータ (4) と、このホストコンピュータ (4) から例えば SCSI インターフェース等を介してイメージデータ、文字データ及び線画データ等の画像データを受信して印刷処理するプロッタ・プリンタ (6) とから構成されている。

【0006】ホストコンピュータ（４）には、画像を所定のイメージデータとして入力処理してホストコンピュータ（４）へ取り込むためのスキャナ（図示省略）と、文字、記号などのキャラクタコードをホストコンピュータ（４）へ入力するキーボード（図示省略）と、ホストコンピュータ（４）での線画データ等の作成・編集時に座標データや所定のコマンドをホストコンピュータ

（４）へ入力するマウス（図示省略）とが備えられている。ホストコンピュータ（４）側において、原カラー画像データは、ハードディスク等の作業メモリに一旦格納される。

【0007】即ち、原カラー画像データは、スキャナから読み込まれた圧縮されたカラーイメージデータ、キーボードから入力される文字コード、及びマウスなどを用いて生成された線画データ等から構成されるが、これらのデータがアプリケーション（２）のグラフィック描画機能によってラスターライズされ、このラスターライズデータ即ちRGBフルカラーデータ（８）が作業メモリに格納されることになる。作業メモリに格納された原カラー画像データは、ドライバ（１０）により自動的に、あるいは、CADオペレータのキーボード操作により処理速度優先データ（１２）（１４）（１６）と、作画品質優先データ（１８）に区分けされ、プリンタドライバ（１０）に供給されている。

【0008】例えば、スキャナで読みとった地図データに10cm角程度の写真データを張り付ける場合には、地図データは作画品質優先データ（１６）として区分けされ、写真データは処理速度優先データ（１０）（１２）（１４）に区分けされる。プリンタドライバ（１０）は、ラスターライズデータをプリンタ・プロットに適したプリンタ出力用のカラー画像データに変換処理するラスターイメージプロセッサ（RIP）（１８）を備え、例えばエッジ強調部、拡大／縮小部、色補正部、2値化部、RGB-CMYK変換部等を備えている。

【0009】エッジ強調部は印刷出力される画像の輪郭を明確に表現するための機能を持つ。印刷出力される画像は画素で表現されるため、輪郭が不明確となり易い。そこでエッジ強調部では、例えばガウシアンフィルタ処理等により画像のエッジ部分を強調する。拡大／縮小部は、印刷出力される画像のサイズを拡大したり、あるいは縮小して表現するための原カラー画像データを変換する機能を持つ。

【0010】印刷出力される画像データは、画素で表現されるため、特に原カラー画像データをそのまま拡大すると画像が粗くなる。そこで拡大／縮小部では、各画素の周辺領域の画像データを参照して補間する。色補正部は、ホストコンピュータ内部で表現された数値の色と、プリンタで実際に出力される色との違い、即ち両装置間の特性差によって生じる若干の色合いのずれを補正するもので、予め用意されたカラーマッチングテーブルをラ

スタライズデータの各画素で参照して画素の色を置き換える。

【0011】2値化部は、RGBフルカラーで表現された画像データを疑似フルカラー画像に変換するもので、例えばホワイト、シアン、マゼンタ、イエロー、ブラック、レッド、グリーン、ブルーの8通りの色を組み合わせさせてフルカラーに見えるように画像データを再構築する。この2値化部では、周知のパターンディザ法、誤差拡散法等が使用される。2値化部で求められた各画素の色は、RGB-CMYK変換部で、プリンタで出力可能なシアン、マゼンタ、イエロー、ブラックの4つのインク色に変換され、CMYK 2値データ（２２）として出力される。

【0012】プロット・プリンタ（６）は、ホストコンピュータ（４）から送られてくるRGBフルカラーデータ（８）を、中間コード化処理部（２４）（２６）（２８）で中間コード化し、各レイヤ（３０）（３２）（３４）で保存する。プロット・プリンタ（６）側のドライバは、上書き・下書き判定部（３６）を備えている。

【0013】上書き・下書き判定部（３６）で選択された上書き用あるいは下書き用の中間コード化されたRGBフルカラーデータは、プロット・プリンタ（６）側のラスターイメージプロセッサ（３８）でプリンタ・プロット（６）が印字できる色に2値表現され、データ合体部（４０）に送られる。データ合体部（４０）は、プロット・プリンタ（６）側で2値化処理したデータと、ホストコンピュータ（４）側で2値化処理したデータとを合体する。出力処理部（４２）は、これら合体されたデータをバンド毎に印字する。

【0014】次に、本実施の形態の動作について説明する。まず、ホストコンピュータ（２）は、処理速度優先データ（１２）（１４）（１６）を、RGBフルカラーデータ（８）として、プロット・プリンタ（６）側に送る。プロット・プリンタ（６）は、送られてきたデータを印字せずに中間コードの形でレイヤ（３０）（３２）（３４）に蓄積する。プロット・プリンタ（６）側で処理するデータは、イメージデータに限らずベクタデータも含まれる。プロット・プリンタ（６）側で処理するデータは、重み付けされレイヤ処理することも可能である。

【0015】このとき、最後にプロット・プリンタ（６）側に送られる、ホストコンピュータ（４）側で処理された2値化データの下に印字するレイヤがあってもかまわない。最後に、ホストコンピュータ（４）側で2値化処理されたデータ（２２）が、プロット・プリンタ（６）のデータ合体部（４０）に送られる。このデータ（２２）がすでに2値化されているため、プロット・プリンタ（６）は、受信した順に印字していくことで、プロット・プリンタ（６）側のメモリが軽減できる。

【0016】ホストコンピュータ（４）側で処理された

データと、プロッタ・プリンタ（６）側のラスタイメージプロセッサ（３８）で処理したデータは、合体されて、バンド毎に印字される。このとき、プロッタ・プリンタ（６）側で処理するデータは、ホストコンピュータ（４）側で処理されたデータの上書き・下書き双方とも可能である。スキャナで読みとった地図データに１０ｃｍ角程度の写真データを張り付ける場合、地図は、高品質のプリンタ出力用のラスタイメージを生成するため、ホストコンピュータ（４）側でプリンタ出力用ラスタイメージ生成２値化処理が行われる。

【００１７】写真は、概略がわかれば良いので、プロッタ・プリンタ（６）側のプリンタ出力用ラスタイメージ生成処理部（３８）で２値化処理される。プロッタ・プリンタ（６）側で２値化処理するデータは、ホストコンピュータ（４）側で２値化処理するデータより前に送られていなければならない。そうしないと、バッファオーバーフローした場合、作画できなくなる。ホストコンピュータ（４）側で２値化処理されたデータは、バッファオーバーフロー後も作画することができる。

【００１８】更に、後から送ったデータに上書きして先行データを作画することができないので、上書き・下書き判定部（３６）が無い場合には、ホストコンピュータ側の２値化データ処理は、写真の部分を抜いておかなければならない。この作業は極めて複雑である。先行データを後から送られるホストコンピュータ（４）側の２値化データに上書きするという機能を付加することによって、ホストコンピュータ（４）側の２値化処理作業の軽減が図れる。

【００１９】また、ホストコンピュータ（４）側の２値化データの一部にベクタのポリゴン機能を用いて色を塗りたい場合は、ホストコンピュータ（４）側の２値化データが上になっている必要がある。この場合は、先行するポリゴンデータを後から送られるホストコンピュータ（４）側の２値化データに下書きすれば良い。

【００２０】尚、ホストコンピュータ（４）側で原カラー画像データをプリンタ出力用ラスタイメージデータに変換する画像処理は、その処理の一部をプロッタプリン

タ（６）側のラスタイメージプロセッサ（３８）に行わせても良く、また、同様に、プロッタ・プリンタ

（６）側で原カラー画像データをプリンタ出力用ラスタイメージデータに変換する画像処理は、その処理の一部を、ホストコンピュータ（４）側のラスタイメージプロセッサ（２０）に行わせても良い。

【００２１】

【発明の効果】本発明は上述の如く構成したので、スキャナで読みとった地図データなどの作画品質優先データを高精細に印字でき、ラフな写真画、イラスト画などの処理速度優先データの印字を高速で行うことができる。

【図面の簡単な説明】

【図１】本発明の一実施形態であるカラー画像印刷システムの構成を示すブロック図である。

【符号の説明】

- ２ アプリケーション
- ４ ホストコンピュータ
- ６ プロッタ・プリンタ
- ８ RGBフルカラーデータ
- 10 ドライバ
- 12 処理速度優先データ
- 14 処理速度優先データ
- 16 処理速度優先データ
- 18 作画品質優先データ
- 20 ラスタイメージプロセッサ
- 22 CMYK 2値データ
- 24 中間コード化処理部
- 26 週間コード化処理部
- 28 中間コード化処理部
- 30 レイヤ
- 32 レイヤ
- 34 レイヤ
- 36 上書き・下書き判定部
- 38 ラスタイメージプロセッサ
- 40 データ合体部
- 42 出力処理部

【図1】

